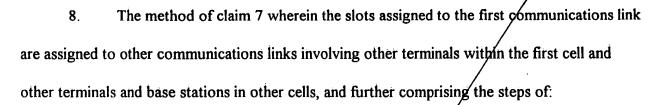We claim:
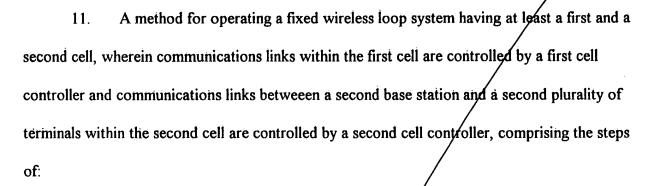
1.   A method for operating a fixed wireless loop system, comprising the steps of:

    (A)   receiving a request by a terminal to establish a first communications link; and

    (B)   allocating at least two temporal communication slots to the requesting terminal to

    support the first communications link if interference caused by and interference

    experienced by the first communications link are acceptably low.

2.   The method of claim 1 wherein, in step (A), a cell controller receives the request

over a control channel.

3.   The method of claim 1 wherein, in step (B), one of the two communication slots is

used by the terminal to transmit to a base station, and the other one of the two communication

slots is used for base station transmissions to the terminal.

4.   The method of claim 3 wherein the terminal transmits to the base station on a first

frequency and the base station transmits to the terminal on a second frequency.

5.   The method of claim 1 wherein the fixed wireless loop system is comprised of at

least a first cell and a second cell, and the first communications link is in the first cell, and

wherein, in step (B), the interference caused by the first communications link is experienced by

one or more other communications links in the first cell and the interference experienced by the

first communications link is caused by one or more other communications link in the first cell.
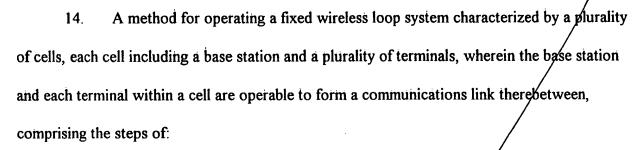
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6. The method of claim 1 wherein the fixed wireless loop system is comprised of at least a first cell and a second cell, and the first communications link is in the first cell, and wherein, in step (B), the interference caused by the first communications link is experienced by one or more other communications links in the second cell and the interference experienced by the first communications link is caused by one or more other communications link in the second cell.

7. A method for operating a fixed wireless loop system containing a plurality of cells, wherein each cell includes a base station and a plurality of terminals, and wherein a request by a terminal located in a first cell to establish a first communications link between itself and the base station in the first cell is processed by a cell controller associated with the first cell, comprising the steps of:

(A) assigning at least two temporal communication slots to the requesting terminal to support the first communications link if interference caused by and interference experienced by the first communications link are acceptably low; and

(B) generating an uplink beam at the base station for rec eiving transmission from the terminal and a downlink beam for transmitting to the terminal in the assigned temporal communication slots, wherein both beams are optimized to maximize signal-to-total-interference ratio.
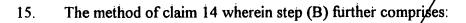
8.   The method of claim 7 wherein the slots assigned to the first communications link are assigned to other communications links involving other terminals within the first cell and other terminals and base stations in other cells, and further comprising the steps of:

(D)   modifying existing uplink and downlink beams for the other communications links within the first cell to mitigate the interference caused by and experienced by the first communications link once generated, respectively; and

(E)   estimating the signal-to-total-interference ratio for each modified uplink and downlink beam.

9.   The method of claim 8 further comprising the step of:

(F)   providing information concerning the first communications link and the signal-to-total-interference ratios calculated for the modified beams of the other links to controllers of other cells of the plurality.

10.   The method of claim 9 further comprising the step of:

(G)   modifying existing uplink and downlink beams for the other communications links in other cells based on the information provided in step (F).

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11.   A method for operating a fixed wireless loop system having at least a first and a second cell, wherein communications links within the first cell are controlled by a first cell controller and communications links betweeen a second base station and a second plurality of terminals within the second cell are controlled by a second cell controller, comprising the steps of:

(A)   exchanging information between the first cell controller and the second cell controller, the exchanged information indicative of changes in the communications links within each of the cells; and

(B) .   allocating time slots to support communications links within the first cell based on the information received from the second cell controller and allocating time slots to support communications links within the second cell based on the information received from the first cell controller.

12.   The method of claim 11 wherein, in step (A), the exchanged information comprises notification of the addition or deletion of a communications links and the signal-to-total interference ratio of each communications link within the cell providing the information.

13.   The method of claim 12 further comprising the step of:

(C)   forming a list of active links, wherein the list contains data indicative of the signal-to-total interference ratio of communications link within the first cell and the second cell.

14.   A method for operating a fixed wireless loop system characterized by a plurality of cells, each cell including a base station and a plurality of terminals, wherein the base station and each terminal within a cell are operable to form a communications link therebetween, comprising the steps of:

(A)   defining a first cluster for a first cell, wherein the first cluster of the first cell includes all other cells that can experience significant interference due to, or cause significant interference with, transmissions originating in the first cell;

(B)   forming a data base comprising every formable communications link within the first and every formable communications link within each cell in the first cluster, wherein the data base includes data pertaining to the mutual interference levels between the links within the cell and the links within the cluster;

(C)   receiving a request by a terminal in the first cell to form a communications link with the base station of the first cell;

(D)   allocating at least two temporal communication slots to the requesting terminal to support the first communications link if interference caused by, and interference experienced by, the first communications link are acceptably low, wherein such interferences are determined using data from the data base; and

(E)   generating an uplink beam at the base station for receiving transmission from the terminal and a downlink beam for transmitting to the terminal in the assigned temporal communication slots, wherein both beams are optimized to maximize a signal-to-total-interference ratio using data from the data base.
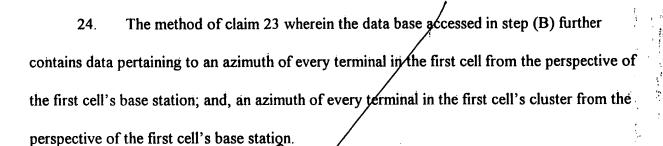
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15.   The method of claim 14 wherein step (B) further comprises:

(i)   directing a downlink beam from the base station in the first cell to a first terminal in the first cell;

(ii)   measuring, at every other terminal in the first cell, and every other terminal in the first cluster, a received signal strength while the downlink beam is directed toward the first terminal;

(iii)   repeating step (i) for each terminal within the first cell, while taking the measurements described in step (ii).

16.   The method of claim 15 wherein step (B) further comprises communicating the measurements of step (B)(ii) and (B)(iii) to a cell controller associated with the communicating terminal's cell.

17.   The method of claim 16 wherein the cell controller of each other cell in the first cluster communicates the measurements to a first cell controller in the first cell.

18.   The method of claim 17 wherein step (B) further comprises:

(iv)   directing an uplink beam from the base station in the first cell to a first

transmitting terminal in the first cell;

(v)   measuring, at every other base station in the first cluster, the received signal

strength as such other base stations direct uplink beams sequentially toward every

terminal in their respective cells;

(vi)   repeating step (iv) for each terminal within the first cell, while taking the

measurements described in step (v).

19.   The method of claim 18 wherein step (B) further comprises communicating the

measurements of step (B)(v) and (B)(vi) to a cell controller associated with each communicating

terminal's cell.

20.   The method of claim 19 wherein the cell controller of each other cell in the first

cluster communicates the measurements to a first cell controller in the first cell.

21.   The method of claim 14 wherein step (B) further comprises forming a list of

active links containing data indicative of a signal-to-total interference ratio for every active

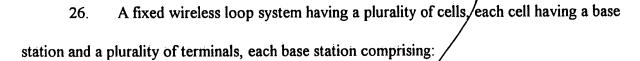communications link within the first cell's cluster.

22.   A method for operating a fixed wireless loop system, comprising the steps of:

(A)   processing a request by a terminal to establish a first communications link within

a first cell by allocating at least two time slots to support the link, one of the time

slots for uplink transmission by the terminal to a base station, and the other time

slot for downlink transmission from the base station to the terminal, wherein

allocation of the time slots is based on interference caused by, and experienced

by, the first communications link;

(B)   generating one or more notches in the downlink beam and the uplink beam that

       · support the communications link; wherein,

each notch generated in the downlink beam attenuates a signal resulting from the

downlink transmission that is received by another communications link, and each notch

generated in the uplink beam attenuates a signal resulting from the uplink transmission of the

other link that is received by the first communications link, thereby reducing the interference that

would otherwise be caused by, and experienced by, the first communications link.

23.   The method of claim 22 wherein step (B) further comprises accessing a data base

containing data pertaining to mutual interference between the first communications link and the

other communications link.

24.   The method of claim 23 wherein the data base accessed in step (B) further

contains data pertaining to an azimuth of every terminal in the first cell from the perspective of

the first cell's base station; and, an azimuth of every terminal in the first cell's cluster from the

perspective of the first cell's base station.

25.   The method of claim 23 wherein step (B) further comprises accessing a list of

active links containing data pertaining to a signal-to-total interference ratio for active

communications links within the first cell's cluster.

26.   A fixed wireless loop system having a plurality of cells, each cell having a base station and a plurality of terminals, each base station comprising:

a receiver for receiving radio signals from any one of the plurality of terminals within the base station's cell;

a transmitter for transmitting radio signals to any one of the plurality of terminals within the base station's cell;

a data base for storing interference data;

a cell controller for coordinating in-cell communications between the base station and the plurality of terminals within its cell,   the cell controller operable to communicate information pertaining to the in-cell communications to other cell controllers of other cells and to receive information from other cell controllers pertaining to communications within their respective cells; wherein

at least a portion of the interference data stored in the data base is included in the information received from other cell controllers and further wherein the cell controller obtains information for coordinating the in-cell communications by accessing the data base.

27.   The system of claim 26, wherein, cell clusters are defined within the plurality of cells, each cell having a distinct cell cluster that includes all other cells that can experience significant interference due to, or cause significant interference with, transmissions originating in the cell, the data base further comprising the mutual interference levels between every formable communications link within the cell and every formable communications link within all other cells in its cluster.

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28.   The system of claim 27 wherein the database further comprises:

the azimuth of every terminal in the cell from the perspective of the cell's base station;

and, the azimuth of every terminal in the cluster from the perspective of the cell's base station.

29.   The system of claim 27, further comprising a list of active links containing

information pertaining to a signal-to-total interference ratio for every active link in the cell's

cluster.